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Title: Cross-cultural and comparative epidemiology of insomnia: the Diagnostic and Statistical Manual (DSM), International Classification of Diseases (ICD) and International Classification of Sleep Disorders (ICSD)

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Highlights

- We estimate prevalence of insomnia in the general population using a validated scale.
- DSM-IV, DSM-5, ICD-10 and ICSD-2 insomnia diagnosis at 22.1%, 10.8%, 4.7% and 15.1%.
- Prevalence of insomnia disorder is similar between Hong Kong and the U.S.
- Of the insomnia symptoms, nonrestorative sleep most affected by quantitative criteria.

Abstract

Objective: To compare the prevalence of insomnia according to symptoms, quantitative criteria and DSM-IV, DSM-5, ICD-10 and ICSD-2 diagnoses, and based on using a similar methodology with the America Insomnia Survey, compare the prevalence of insomnia disorder between Hong Kong and the United States.

Methods: Population-based epidemiological survey respondents (n = 2011) completed the Brief Insomnia Questionnaire, a validated scale generating insomnia diagnoses according to the DSM-IV, DSM-5, ICD-10 and ICSD-2.

Results: The weighted prevalence of difficulty falling asleep, difficulty staying asleep, waking up too early, nonrestorative sleep and any of the insomnia symptoms that occurred ≥ 3 days per week was 14.0%, 28.3%, 32.1%, 39.9%, and 65.4%, respectively. The prevalence reduced when quantitative criteria was included, ranging from a drop from 39.9% to 8.4% for nonrestorative sleep to 14.0% to 12.9% for difficulty initiating sleep. The weighted prevalence of DSM-IV, ICD-10, ICSD-2 and any of the 3 insomnia disorders was 22.1%, 4.7%, 15.1%, and 22.1%, respectively; for DSM-5 insomnia disorder, it was 10.8%. About 2.6% of the participants fulfilled all diagnostic criteria.

Conclusion: Compared to the 22.1%, 3.9%, 14.7%, and 23.6% for DSM-IV, ICD-10, ICSD-2, and any of the 3 diagnoses in the America Insomnia Survey, cross-cultural difference in the prevalence of insomnia disorder is less than what is expected. From DSM-IV to DSM-5, the prevalence is reduced by half. ICD-10 insomnia disorder has the lowest prevalence, perhaps because excessive concern and preoccupation, one of its diagnostic criteria, is not always present in people with insomnia.

Keywords: DSM-5; DSM-IV-TR; ICD-10; ICSD-2; Insomnia; Prevalence

Highlights

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- Prevalence of insomnia disorder is similar between Hong Kong and the U.S.
- Of the insomnia symptoms, nonrestorative sleep most affected by quantitative criteria.

Introduction

Insomnia is a distressing and disabling condition that affects a significant proportion of the general population. One of the problems in interpreting the large body of epidemiological data is the different sets of questions and criteria used to assess and define insomnia, resulting in a wide range of prevalence rates. In a review of more than 50 epidemiological studies [1], the prevalence of insomnia symptoms in the general population was estimated at 10-48%; for insomnia symptoms that often or always occur or occur at least 3 nights per week, it ranged from 16-21%, for insomnia symptoms with daytime consequences, it was 9-15%, for dissatisfaction with sleep quantity or quality, it was 8-18%, while for Diagnostic and Statistical Manual, Fourth Edition (DSM-IV) [2] insomnia disorder, it ranged from 4-6%.

The use of standardized criteria results in greater accuracy in the estimate of prevalence rates; however, no single set of criteria has been accepted by researchers around the world. The DSM-IV-TR [3], International Classification of Diseases, Tenth Edition (ICD-10) [4], and research diagnostic criteria/International Classification of Sleep Disorders, Second Edition (RDC/ICSD-2) [5,6] are commonly used diagnostic systems. All 3 systems require difficulties initiating or maintaining sleep in addition to daytime distress or impairment, but they differ in other symptoms that are required for diagnosis. Nonrestorative sleep is 1 of the insomnia symptoms in DSM-IV-TR and RDC/ICSD-2; for ICD-10, poor quality sleep is included. RDC/ICSD-2 stipulates that sleep problems occur despite adequate opportunity and circumstances for sleep; while for ICD-10, preoccupation with sleeplessness and excessive concern over consequences is 1 of the diagnostic criteria. Another issue is that recent studies have suggested that sleep dissatisfaction may be an important indicator of sleep pathology [7]. In the newly published DSM-5 [8], dissatisfaction with sleep quantity and quality, a

subjective complaint, has been included as a necessary condition for insomnia diagnosis; in addition, the frequency of sleep problems of at least 3 nights per week and duration of at least 3 months are required.

In Hong Kong, the prevalence of insomnia in the general population was estimated at 11.9% [9], based on the presence of difficulty initiating sleep, difficulty maintaining sleep or early morning awakening that occur at least 3 nights per week in the past month. Using similar frequency criteria, another study found a rate in children at 4% in the past 12 months [10]. In mainland China, Xiang et al. found that the prevalence of any insomnia symptoms that occur nearly every night for at least 2 weeks in the past year was 9.2% [11]. In a Taiwan study, the prevalence of any insomnia symptoms that usually occur or occur all the time during the past month was 25.5% [12]. Another study showed that the prevalence of any insomnia symptoms that occur almost every night for more than 2 weeks was 4.0% in Japan, 9.9% in South Korea, and 10.3% in Taiwan [13]. Although the studies have provided valuable data, owing to the difference in methodology and definition, the actual prevalence of insomnia in Asian countries is still unclear; hence, cross-cultural and cross-country comparison is not possible.

Recently, a standardized questionnaire, the Brief Insomnia Questionnaire (BIQ), was developed for use in the America Insomnia Survey. Validated against clinical diagnoses by experts, the BIQ was able to estimate insomnia prevalence according to the DSM-IV-TR, ICD-10, and RDC/ICSD-2 criteria [14]. With 2 additional questions, the prevalence of DSM-5 insomnia disorder could be obtained with sufficient accuracy [15]. A wide range of insomnia prevalence was derived based on different diagnostic systems. DSM-IV-TR insomnia disorder in the U.S. general population was estimated at 22.1% according to the America Insomnia Survey; for RDC/ICSD-2, it was 14.7%, for ICD-10, it was 3.9%, and

based on any of the systems, it was 23.6% [16]. Data derived from the Great British Sleep Survey suggested that 45.7% of the general population were having DSM-5 insomnia disorder [17] which was unexpectedly high compared to previous studies; as the questionnaire used has not been validated against clinical diagnosis, the accuracy of the estimate is uncertain. With similar methodological limitation, the Nord-Trøndelag Health Study estimated that the prevalence of DSM-5 insomnia disorder was 7.1% in Norway [18]. In view of the changes from DSM-IV-TR to DSM-5, comparative data on the prevalence of insomnia disorder is needed. We used a validated Chinese version of the BIQ to examine the prevalence of insomnia symptoms and disorders in the general population of Hong Kong. The findings would have significant implication in cross-cultural and comparative epidemiology of insomnia.

Methods

Sample

The study population consisted of Hong Kong residents who were ≥ 18 years and able to communicate in Cantonese or Mandarin Chinese languages. The randomization and telephone interview, conducted by the Public Opinion Programme, University of Hong Kong, have been presented in our previous study [15]. The randomization process included randomization of telephone numbers and selection of respondents in households according to the next birthday rule. As of September 2012, the fixed telephone line density in Hong Kong was 102 lines per 100 households, which was among the highest in the world [19]. We selected telephone numbers randomly from a computerized residential telephone directory, and then generated additional numbers using the “+/- 1 and 2 method” to capture some

unlisted numbers. Verbal consent was obtained from all participants and all procedures used in this study were reviewed and approved by the local institutional review board. A total of 25,554 telephone numbers were called from July 24 to December 6, 2012. After exclusion of the invalid numbers ($n = 9,886$), no-answer numbers, busy lines, or numbers with answering device despite a minimum of 5 recalls ($n = 5,286$), fax numbers ($n = 1,187$), non-residential numbers ($n = 2,110$), numbers with call-blocking or other technological difficulties ($n = 194$), numbers which hanged up before or after introduction ($n = 3,144$), non-Chinese residential numbers ($n = 561$), and numbers with no eligible respondents ($n = 59$), a total number of 3,127 telephone calls comprised the eligible sample. From this targeted sample, we successfully interviewed 2,011 respondents, but there were 1,019 refusals at household or respondent-levels and 97 partial responses. The overall response rate was 64.3%.

Measures

The translation of the BIQ into Chinese was conducted according to the World Health Organization guidelines [20], with steps including forward translation, expert review, back-translation, expert review, pre-testing and final version. The criterion validity and test-retest reliability of the Hong Kong version of the BIQ are satisfactory [15]. The study's senior authors (KC and WY) conducted clinical reappraisal interviews using a standardized semi-structured questionnaire, developed specifically for BIQ validation [14], blind to the subjects' BIQ results. The areas under the receiver operating characteristics curve for the DSM-IV-TR, DSM-5, ICD-10 and RDC/ICSD-2 insomnia disorder ranged from 0.76-0.86, indicating high individual-level concordance between BIQ and clinical-interview diagnoses. Short-term test-retest reliability over 2-14 days was moderate for most of the BIQ items. Prevalence estimates based on the BIQ classification were not significantly different from estimates

based on clinical interviews for the DSM-5, RDC/ICSD-2 and any of the DSM-IV-TR, ICD-10 and RDC/ICSD-2 insomnia disorder. With modification of the scoring algorithm for DSM-IV-TR and ICD-10, the accuracy of the BIQ estimates was improved, with no significant difference between prevalence estimates based on the BIQ classification and clinical interviews.

Procedure

A fully-structured, lay-administered telephone interview was conducted. The first section included an introduction and verbal consent, followed by the BIQ, then sociodemographics, including age, gender, occupation and level of education. In most cases, the telephone interview could be completed within 15 minutes.

Data analysis

All statistical analysis was done by SPSS 20.0. Basic descriptive statistics were used to describe sample characteristics and compare with the 2011 population census. All prevalence estimates and 95% confidence interval (CI) were calculated by weighing the cases according to the population distribution of sex and age.

Results

The study sample had a slightly higher mean age and higher proportion of females, married people, retirees and homemakers and people with no income, compared to the census population (Table 1). Table 2 presents the prevalence of insomnia symptoms, quantitative

criterion-based symptoms, sleep dissatisfaction, daytime impairment and concern, and insomnia disorder according to diagnostic criteria. The prevalence of difficulty falling asleep, difficulty staying asleep, waking up too early, nonrestorative sleep and any of the insomnia symptoms that occurred ≥ 3 days per week was 14.0% (CI: 12.5-15.5), 28.3% (CI: 26.3-30.3), 32.1% (CI: 30.1-34.1), 39.9% (CI: 37.8-42.0), and 65.4% (CI: 63.3-67.5), respectively. The prevalence was reduced when quantitative criterion of the BIQ was included. The insomnia symptom with the least change in prevalence estimate after adding quantitative criterion was difficulty falling asleep, whose prevalence reduced from 14.0% to 12.9% when sleep onset latency ≥ 30 minutes was added. The symptom with the greatest change was nonrestorative sleep, with prevalence dropping from 39.9% to 8.4% when nonrestorative sleep had to be at least moderate in severity and total time in bed needed to be at least 7 hours. The most common daytime impairment associated with insomnia was daytime fatigue (22.5%), followed by daytime sleepiness, and daytime attention, concentration or memory problems (21.6% and 16.4%, respectively). About 19.9% (CI: 18.2-21.6) of the survey population was dissatisfied or very dissatisfied with the quality and quantity of sleep.

The prevalence of having at least 1 of the insomnia symptoms and at least 1 of the associated daytime impairment or distress was 32.7% (CI: 30.7-34.8), which was half of the prevalence of having at least 1 of the insomnia symptoms (65.4%, CI: 63.3-67.5). When quantitative criteria were included, the prevalence reduced to 23.8% (CI: 21.9-25.7). The prevalence of having at least 1 of the insomnia symptoms that fulfilled the quantitative criterion for at least 1 month and having at least 1 of the associated daytime impairment or distress was 22.1% (CI: 20.3-23.9).

Duration of sleep problems was reported as at least 6 months in 42.2% (CI: 40.0-44.3) of the

sample; for acute insomnia (3-14 days), transient insomnia (2-4 weeks) and subchronic insomnia (1-3 months), the prevalence was 0.6% (CI: 0.5-0.8), 0.5% (CI: 0.4-0.7), and 7.3% (CI: 6.1-8.4), respectively.

The weighted prevalence of DSM-IV-TR, ICD-10, ICSD-2 and any of the 3 insomnia disorders was 22.1% (CI: 20.3-23.9), 4.7% (CI: 3.8-5.6), 15.1% (CI: 13.5-16.7), and 22.1% (CI: 20.3-23.9), respectively, while the weighted prevalence of DSM-5 insomnia disorder was 10.8% (CI: 9.4-12.2).

Figure 1 presents the overlap of the DSM-IV-TR, ICD-10, ICSD-2 and DSM-5 insomnia disorders. About 2.6% of the participants fulfilled all diagnostic criteria. The most common overlap was between the DSM-IV-TR, ICSD-2 and DSM-5 systems (6.7%), followed by cases meeting both the DSM-IV-TR and ICSD-2 diagnoses (5.4%). About 4.3% of the participants satisfied the DSM-IV-TR insomnia diagnosis alone. None of the participants fulfilled the ICSD-2 and ICD-10 criteria alone.

Discussion

This study extended our understanding of the cross-cultural epidemiology of insomnia and was the first comparative study of DSM-IV-TR, DSM-5 ICD-10 and RDC/ICSD-2 insomnia disorders. The salient findings of the present study were: (i) using the same structured interview, we showed that the prevalence of insomnia disorder was similar between Hong Kong and the United States; (ii) the prevalence of DSM-5 insomnia disorder was estimated to be half of that of DSM-IV-TR diagnosis; (iii) people with insomnia disorder most often satisfied DSM-IV-TR, ICSD-2 and DSM-5 criteria, followed by cases fulfilling either DSM-

IV-TR and ICSD-2 or DSM-IV-TR alone; (iv) agreement between the prevalence of insomnia at symptom-level and quantitative-criterion-level varied according to the types of insomnia symptom; (v) about 8.4% of the sample complained of sleep problems that lasted at least 3 days but shorter than 3 months; and (vi) fatigue was the most common daytime impairment associated with insomnia.

The first finding was unexpected as the biological constitution and socio-cultural environment is quite different between people from Hong Kong and the United States, but we found that the weighed prevalence of DSM-IV-TR, ICD-10 and ICSD-2 insomnia disorder was either identical or within 1% difference. ICD-10 insomnia disorder was the lowest in prevalence, perhaps because excessive concern and preoccupation with insomnia, one of diagnostic criteria, was not always present in participants with insomnia. Considering 2 other studies from Hong Kong and the United States which used similar interview methodology [21,22], the finding in this study was actually no surprise, as the 2 studies [21,22] reported very similar prevalence of DSM-IV-TR insomnia disorder in adolescents, only 0.1% difference, at 9.3% and 9.4%, respectively. Since the sample size in this study and the previous studies is relatively small, further research on cross-cultural epidemiology of insomnia is still needed.

It is of interest to compare findings using the BIQ and Sleep-EVAL, a diagnostic interview developed by Ohayon et al. [23]. While the BIQ obtained similar prevalence in Hong Kong and America, the Sleep-EVAL generated different prevalence of DSM-IV insomnia disorder in Korea (5.0%) [24], Spain (6.4%) [25], Italy (7.0%) [26] and Finland (11.7%) [27]. Albeit different years the studies were conducted, there are other possibilities. First, the Sleep-EVAL was used without validation in non-English speaking countries, so the diagnostic accuracy

can be affected. Second, the computer-aided Sleep-EVAL system prohibited the co-occurrence of 2 diagnoses when a condition occurred exclusively during the course of the others; hence, psychiatric and medical disorders with insomnia were not counted as insomnia disorder. As a result, the prevalence of insomnia disorder generated by the Sleep-EVAL is usually lower [21]; in addition, it can be affected by the characteristics of comorbid insomnia, which may be different between countries. Lastly, only the study in Finland is an obvious outlier, and the authors suggested that it was due to a high number of substance-induced insomnia in their country.

With the duration criterion increased from 1 to 3 months and other additional changes from DSM-IV-TR to DSM-5, the weighed prevalence of insomnia disorder was reduced from 22.1% to 10.8%. Around 6.7% of the sample fulfilled the DSM-IV-TR, ICSD-2 and DSM-5 insomnia disorder criteria, 2.6% fulfilled all 4 diagnostic criteria, while 9.7% fulfilled either DSM-IV-TR and ICSD-2 criteria or DSM-IV-TR alone. Only a small proportion fulfilled all 4 diagnostic criteria, perhaps because many of those who fulfilled DSM-5 criteria did not meet the ICD-10 criteria. The results are in line with our qualitative study on subjective experience of chronic insomnia [28]. Many participants in the focus groups reported that they tried to live their sleep problem. Such accepting attitude may have reduced their concern and preoccupation with insomnia.

Our study provided interesting data on the relationship between insomnia symptoms and quantitative criteria. Over 90% of the participants with complaints of difficulty falling asleep reported having sleep onset latency of at least 30 minutes, while only one-third to two-third of those with complaints of difficulty staying asleep reported staying awake for 30 minutes or longer during the night or waking up at least 3 times. It was possible that many participants

with complaints of difficulty staying asleep only experienced shallow sleep without actual awakening. We found that only two-third of the participants with complaints of waking too early in the morning reported waking up at least 30 minutes earlier. The results suggest that quantitative criteria, if used, should vary with insomnia symptoms. Shorter time spent awakened in the night or awakened earlier than planned may have caused concern compared to the time taken to fall asleep. Our findings cast some doubts on previous studies regarding quantitative criteria for insomnia [29,30], which used the same cutoff for sleep onset latency, wake after sleep onset and terminal wake time. The prevalence of nonrestorative sleep dropped almost 5-fold when total sleep time of at least 7 hours and moderate severity of nonrestorative sleep were required. The finding suggests that nonrestorative sleep is readily influenced by additional conditions, and it may be one of the reasons that DSM-5 has removed nonrestorative sleep as one of the diagnostic criteria. A wide range in the prevalence of nonrestorative sleep, from 1.4% to 35%, has been reported [31] and there are substantial differences between nonrestorative sleep and other insomnia symptoms in terms of sociodemographic factors, sleep and medical comorbidity, inflammatory marker, functional impairment, and longitudinal course [32,33]. In line with some researchers in the field [31,34], we believe including normal sleep duration in the criteria of nonrestorative sleep may be needed in future studies.

About 8.4% of the sample complained of insomnia from 3 days to 3 months, which was used to define acute insomnia in some studies [35,36]. The prevalence of acute insomnia derived from this study was compatible with the prevalence in the United States (9.5%) and in United Kingdom (7.9%) [36]. Ellis et al. [36] estimated that around 20% of acute insomnia cases would transit from acute to chronic insomnia, 80% would remit, and 50% were recurrent cases. The results are in line with a prospective study which showed frequent changes of

insomnia status, from insomnia syndrome to insomnia symptoms and good sleepers, or vice versa, over a 12-month period, especially for insomnia that has occurred for shorter than 3 months [37]. Limited data have been available on the clinical significance of acute insomnia. It is possible that recurrent acute insomnia may have significant health risks and represents different psychiatric nature compared to chronic insomnia. Further studies are needed to test this hypothesis.

We found that insomnia symptoms have resulted in fatigue, sleepiness, impaired concentration and motivation, but to a lesser extent anxiety and depression, impaired social and occupational functioning, and errors or accidents. We found that about half of the participants with insomnia symptoms did not fulfill our criteria of significant impairment or distress, which was slightly higher than the 30% in Ohayon's review [1]. Albeit different follow-up periods in previous longitudinal studies, it has been suggested that the persistence rate of insomnia in Hong Kong Chinese is lower [38], perhaps due to their lower level of perceived distress and impairment, which partially contributes to symptom remission.

Our study has several methodological limitations. The major limitation was that we did not perform in-person clinical evaluation, but relied on the BIQ in deriving diagnoses. Although the BIQ has been validated against clinical interview and was found to have high criterion validity, the BIQ classification could still have false positives and false negatives. In addition, there were differences in sociodemographic characteristics between our sample and the census population, although we adjusted for age and gender in estimating the prevalence. The other limitation was the relatively small sample size, resulting in a 3-4% confidence interval in the prevalence estimates. Our response rate was only 64.3%, which was lower than the 70% obtained in most epidemiological studies, despite being similar to the America Insomnia

Survey. There were a large number of no-answers or hanging up calls of which eligibility was not determined. The response rate could be much lower if they were taken into account, and this is one of the major limitations with telephone and web-based survey. In addition, there have been an increasing number of households, especially in the younger generation to rely entirely on mobile phone rather than fixed telephone line; hence, were missed out in our survey. This might be one of the reasons that our sample was older in age compared to the census population. Our quantitative criteria followed the scoring algorithm of the BIQ, which used a cutoff of 30 minutes, instead of the recognized 31 minutes cutoff in a previous study [23]. Lastly we had not asked the use of sleep-promoting medication and other interventions, which could mask the severity of insomnia.

In conclusion, using a validated and structured interview, we confirm that insomnia disorder is highly prevalent in the general population, but cross-cultural difference in the prevalence of insomnia disorder seems less apparent than it is expected, at least between Hong Kong and the United States. From DSM-IV-TR to DSM-5, the prevalence of insomnia disorder is estimated to be reduced by half. Another important finding is that acute insomnia of 3 days to 3 months is quite common, suggesting that this acute form of insomnia should deserve more attention.

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Figure 1. Overlap of DSM-IV, DSM-5, ICD-10 and ICSD-2 Insomnia Disorder

Table 1. Sociodemographic characteristics of the sample compared to censuses population data

	Hong Kong general population aged ≥ 18 yr ^a (N = 5,999,455)	Total sample (N = 2,011)
Age in yr, mean (SD)	46.51 (17.2)	52.20 (17.9)
Sex, male/female	1/1.18	686/1325 (1/1.93)
Education, N (%) ^b		
Primary	23.7%	520 (26.0)
Secondary	48.1%	993 (49.7)
Tertiary	28.3%	484 (24.2)
Marital status, N (%) ^b		
Never married	28.8%	415 (20.9)
Married	60.1%	1432 (72.1)
Divorced	4.1%	60 (3.0)
Cohabited, separated or widow	7.0%	80 (4.0)
Occupation N (%) ^b		
Professional and associate professional	22.0%	313 (15.8)
Skilled and semi-skilled worker	26.1%	406 (20.4)
Unskilled worker	11.8%	80 (4.0)
Retired	18.0%	530 (26.7)
Students	2.5%	123 (6.2)
Homemakers/others	17.5%	475 (23.9)
Unemployed	2.1%	60 (3.0)
Income, N (%) ^b		
No income	40.3%	960 (51.1)
< \$10,000	23.2%	368 (19.6)
\$10,000-19,999	20.0%	288 (15.3)
\$20,000-29,999	7.3%	141 (7.5)
>\$30,000	9.2%	122 (6.5)

^a Population census 2011; occupation and income data based on population aged ≥ 20 yr.

^b Difference from total N reflects omissions on reporting forms; income in HK\$.

Table 2. Prevalence of insomnia according to symptoms, quantitative criteria, associated distress or impairment, duration, and DSM, ICD and ICSD diagnoses (total n = 2011)

	Weighted prevalence (95% CI)
<u>Insomnia symptoms ≥ 3 nights/week</u>	
Problems falling asleep	14.0 (12.5 - 15.5)
Problems staying asleep	28.3 (26.3 - 30.3)
Waking too early in the morning	32.1 (30.1 - 34.1)
Nonrestorative sleep	39.9 (37.8 - 42.0)
At least one of the above	65.4 (63.3 - 67.5)
<u>Insomnia symptoms ≥ 3 nights/week + quantitative criteria</u>	
Problems falling asleep and sleep latency ≥ 30 min	12.9 (11.4 - 14.4)
Problems staying asleep and waking up during the night ≥ 3 times	10.1 (8.8 - 11.4)
Problems staying asleep and ≥ 30 min awake at night	18.0 (16.3 - 19.7)
Waking too early in the morning and for ≥ 30 min	20.3 (18.5 - 22.1)
Nonrestorative sleep at least moderate in severity and total sleep time ≥ 7 hours	8.4 (7.2 - 9.6)
At least one of the above	40.1 (38.0 - 42.2)
<u>Dissatisfied or very dissatisfied with sleep</u>	19.9 (18.2 - 21.6)
<u>Sleep problems causing moderate or severe impairment or distress</u>	
Reduced motivation	17.4 (15.7 - 19.1)
Reduced performance at work, school or social activities	12.9 (11.4 - 14.4)
Errors or accidents	5.7 (4.7 - 6.7)
Irritability, nerves or mood disturbance	14.3 (12.8 - 15.8)
Daytime attention, concentration, or memory problems	17.4 (15.7 - 19.1)
Daytime fatigue	22.5 (20.7 - 24.3)
Daytime sleepiness	21.6 (19.8 - 23.4)
Tension headache or digestive problems (at least severe) ^a	3.3 (2.5 - 4.1)
Interfered with home management (at least 7 in a 10-point scale)	5.7 (4.7 - 6.7)
Interfered with ability to work (at least 7 in a 10-point scale)	5.7 (4.7 - 6.7)
Interfered with social life (at least 7 in a 10-point scale)	4.3 (3.4 - 5.2)
Interfered with close relationships (at least 7 in a 10-point scale)	3.4 (2.6 - 4.2)
Concerns or worries about sleep	13.1 (11.6 - 14.6)
Worried or distressed about sleep problems	7.7 (6.5 - 8.9)
At least one of the above	36.2 (34.1 - 38.3)
<u>Any insomnia symptoms ≥ 3 nights/week + impairment/distress</u>	32.7 (30.7 - 34.8)
<u>Any insomnia symptoms ≥ 3 nights/week + quantitative criteria + impairment/distress</u>	23.8 (21.9 - 25.7)
<u>Any insomnia symptoms ≥ 3 nights/week + quantitative criteria + impairment/distress + at least 1 month in duration</u>	22.1 (20.3 - 23.9)

Table 2 (cont.)

	Weighted prevalence (95% CI)
<u>Duration of sleep problems</u>	
Absent or less than 3 days	36.5 (34.4 - 38.6)
At least 3 days but less than 2 weeks	0.6 (0.5 - 0.8)
At least 2 weeks but less than 4 weeks	0.5 (0.4 - 0.7)
At least 1 month but less than 3 months	7.3 (6.1 - 8.4)
At least 3 months but less than 6 months	5.9 (4.8 - 6.9)
At least 6 months	42.2 (40.0 - 44.3)
<u>Insomnia disorder</u>	
DSM-IV-TR	22.1 (20.3 - 23.9)
ICD-10	4.7 (3.8 - 5.6)
ICSD-2	15.1 (13.5 - 16.7)
Any DSM-IV-TR, ICD-10 and ICSD-2	22.1 (20.3 - 23.9)
DSM-5	10.8 (9.4 - 12.2)

^a According to the scoring algorithm of the Brief Insomnia Questionnaire, tension headaches or digestive problems are present if they are severe

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